

Rice is also grown on an extensive scale, chiefly by native farmers (coolies imported from India). This crop is not seriously injured by insects as a general rule, but this season the young rice was in many cases entirely destroyed by *Laphygma frugiperda*. This insect in company with many other pests appeared in enormous numbers at the commencement of the wet weather, which, this year followed a prolonged drought.

Mr. Bodkin also said that in the future he hoped to have more attention paid to the insect fauna of British Guiana; for from an entomological point of view it is an extraordinarily rich, interesting, and practically untouched field. He also expressed his gratitude to those who had offered to assist him in this project.

NOTES ON THE YELLOW CRANE-FLY, *TIPULA FLAVICANS* FABR.

BY A. N. CAUDELL, *Bureau of Entomology.*

On October 28 of the present year I found the above named insect in great numbers at Rosslyn, Virginia. They had issued from clay soil near the river in a situation subject to inundation and at most times very moist. Many hundred adults were flying about and the pupal shells were found in numbers on the ground beneath the thin layer of leaves and debris which had accumulated since the last overflow of the river. As shown by an examination of many old shells the pupa always project a considerable distance out of the ground when the adult emerges. Ordinarily they project about one-half to two-thirds their length, rarely as little as one fourth but often more than two-thirds, in some cases the shells being found entirely clear of the hole of issuance, indicating that they were entirely withdrawn by the adult in emerging. The soil is of a yellow clay nature and well filled with small rootlets upon which the larvæ of the fly probably feed. The occurrence of this species covers some weeks as Mr. Knab found them plentiful at this same locality as early as September 22. Still earlier in the season, in early August, this same situation was populated by another nearly related Tipulid of very similar superficial appearance and also a blackish marked species. Indeed this locality seems to be one very rich in its Tipulid fauna.

Many of these flies observed at Rosslyn were copulating, some during flight and some at rest on the ground or on leaves or twigs. In one case observed by me an apparently freshly emerged female sat on the ground within an inch of what I presume was the pupal shell from which she had issued and was quite covered with a yellowish mass of males. There were six of these males massed over and around this female, one of them mating with her, the other five sitting almost motionless, some with the mouth parts touching her abdomen.

In 1886 J. Mik¹ records observations on certain Tipulidæ mating when the female is freshly emerged. He states that the males sit and wait for the emergence of the females and when they appear mating commences immediately, even before the legs are entirely clear of the pupal shell and while the abdomen is still limp and watery. Observations of this character were made on species of three genera, *Cylindrotoma*, *Dicranomyia* and *Trochobola*. Mik records these observations to refute the idea advanced by another writer that the deposition of fertile eggs by a soft bodied freshly transformed female Coccinellid beetle was a case of parthenogenesis. Mik argues that, while the insect is not fully developed externally, it is sexually perfect internally.

Needham,² describes and figures the pupa of *Tipula flavescens* and states that he bred them in late September from clay subsoil brought up by crayfish in a glacial "pothole" in the state of Illinois.

Many hundreds of the specimens observed by me at Rosslyn, Virginia, were killed by some fungus disease. Dead flies were found in some abundance sitting head upwards on twigs and weed stems, sometimes singly but generally two or more together, often as many as five or six being found in a mass. The abdomens of the dead flies were found to be filled with a pulpy mass similar to that filling the bodies of fungus-killed lepidopterous larvæ. Flies freshly dead look as if perfectly well and active, unless it be that the legs are wrapped more securely around the twig or stem to which it clings. Specimens of these fungus-infested Tipulids were turned over to Prof. Webster for study and determination of the fungus. Other specimens are preserved in the National Museum collection.

LUMINOUS COLLEMBOLA

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Very few of us walk at night in woodland paths without a lantern and this fact is perhaps the explanation of the extremely meager data available on the subject of luminous Collembola. The almost universal ignorance here in America, that such photogenic function occurs in this order is, it is hoped, sufficient apology for the presentation of the following very imperfect observations, and résumé of previous notes which have been brought to my attention. It is hoped that these notes will yield an abundant crop of corroborative and advanced data by the end of another

¹ Ent. Nachr., vol. XII, p. 315.

² Bull. New York State Museum, No. 68, p. 280, 1903.